

Appl. No. : 10/070,214  
Filed : October 18, 2002

### AMENDMENTS TO THE CLAIMS

*Please amend the Claims as follows:*

1. (Currently Amended) A production/injection line assembly for subsea transportation of hydrocarbons, the assembly comprising:

a production/injection tube;

~~heating~~ means for active heating of the tube; and

continuous thermal insulation disposed along the production/injection line, over at least 100 m to control the heat transfer from the ~~heating~~ means for heating in towards the production/injection tube wherein the insulation comprises:

prefabricated inner channel members having longitudinal channels, which inner channel members are laid around the production/injection tube in a continuous production line with the channels of the inner channel members facing outwardly, and

prefabricated outer channel members having longitudinal channels, which outer channel members are laid flush with the channels of the inner channel members in a continuous production line wherein the ~~heating~~ means for heating are laid in the longitudinal channels of the inner channel members and enclosed by the outer channel members, wherein the inner and outer channel members accommodate the ~~heating~~ means for heating and wherein the inner channel members have higher heat transfer properties than the outer channel members so as to facilitate transfer of heat from the means for heating in towards the production/injection tube and to inhibit heat transfer outwards from the production/injection line assembly.

2. (Currently Amended) The assembly of Claim 1, wherein the production/injection ~~line tube~~ also comprises heat conductive material.

3. (Currently Amended) The assembly of Claim 1, wherein the ~~heating~~ means for heating comprise at least one heating pipes/tubes for the transport of a heating fluid.

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4. (Currently Amended) The assembly of Claim 1, wherein the ~~heating~~ means for heating comprises at least one electrical heating cables.
5. (Currently Amended) The assembly of Claim 2, wherein the heat conducting material comprises a thermal conductive layer disposed between the ~~heating~~ means for heating and the production/injection tube.
6. (Currently Amended) The assembly of Claim 5, wherein recesses are formed in the conductive layer, which recesses are adapted to conform to the periphery of the ~~heating~~ means for heating.
7. (Previously Presented) The assembly of Claim 6, wherein the heat conductive material comprise at least one channels, for the transport of heating fluid, formed in the insulation layer, which channels are in thermal contact with the production/injection tube.
8. (Previously Presented) The assembly of Claim 1, wherein the inner channel members have an opening into the longitudinal channel of the channel member, the opening facing the production/injection tube.
9. (Currently Amended) The assembly of Claim 2, wherein the ~~heating~~ conducting material comprises a heat reflective layer disposed outside the ~~heating~~ means for heating.
10. (Currently Amended) The assembly of Claim 1, wherein the ~~heating~~ means for heating comprises a thermal jacket in which are formed heating fluid channels, which jacket is in thermal contact with the production/injection tube.
11. (Previously Presented) The assembly of Claim 5, wherein the thermal conductive layer is made of a material that provides cathodic protection for the production/injection tube.
12. (Currently Amended) The assembly of Claim 1, further comprising a sensor is installed along the production/injection line.
13. (Cancelled)

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14. (Previously Presented) The assembly of Claim 12, wherein the sensor is an optical sensor.

15. (Currently Amended) A method ~~for~~ of supplying heat to a production/injection line, the production/injection line comprising a production/injection tube; ~~heating~~ means for active heating of the tube; and continuous thermal insulation disposed along the production/injection line, over at least 100 m to control the heat transfer from the ~~heating~~ means for heating in towards the production/injection tube wherein the insulation comprises: prefabricated inner channel members having longitudinal channels, which inner channel members are laid around the production/injection tube in a continuous production line with the channels of the inner channel members facing outwardly, and prefabricated outer channel members having longitudinal channels, which outer channel members are laid substantially flush with the channels of the inner channel members in a continuous production line wherein the ~~heating~~ means for heating are laid in the longitudinal channels of the inner channel members and enclosed by the outer channel members, wherein the inner and outer channel members accommodate the ~~heating~~ means for heating and wherein the inner channel members have higher heat transfer properties than the outer channel members so as to facilitate transfer of heat from the means for heating to the production/injection tube and to inhibit heat transfer outwards from the production/injection line, the method comprising supplying at least one of cooling fluid and waste fluid from a process on an installation ~~in transport~~ to the longitudinal channels along the production/injection tube.

16. (Original) The method according to Claim 15, characterized in that the cooling fluid is wastewater.

17. (Withdrawn) A method for manufacturing a production/injection line for subsea transportation of hydrocarbons, the production/injection line comprising a production/injection tube which comprises a plurality of elongate members, including a core tube, which shall serve as the injection/production tube, at least one of pipes and cables arranged outside the core tube and channel members, including inner and outer channel members, the inner and outer channel members having longitudinal channels in which the at least one of pipes and cables are freely movable, and a protective outer casing, the method comprising the steps of:

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laying the inner channel members around the core tube;

laying at least one of the pipes and cables in longitudinal channels in the inner channel members; and

laying the outer channel members flush with the channels in the inner channel members so that the at least one of pipes and cables are enclosed by the channel members, and wherein the insulation are composed of at least a portion of the channel members.

18. (Withdrawn) The method of Claim 17, further comprising the step of winding the insulation and heat conducting means in a spiral around the core tube.

19. (Withdrawn) The method of Claim 17, further comprising the step of winding the injection/production line up on at least one reels of large diameter.

20. (Currently Amended) The assembly of Claim 1, wherein the ~~heating~~ means for heating comprises at least one electrical induction cable.

21. (Previously Presented) The assembly of Claim 12, wherein the sensor operates in a continuous manner.

22. (Previously Presented) The assembly of Claim 12, wherein the sensor operates in an intermittent manner.

23. (Previously Presented) The assembly of Claim 12, wherein the sensor measures at least one of temperature, pressure, tension, and leakage.

24. (Previously Presented) The assembly of Claim 14, wherein the sensor is a Bragg type sensor.

25. (Currently Amended) A production/injection line assembly for subsea transportation of hydrocarbons, comprising:

a production/injection tube and arranged along the production/injection line, over a length of at least 100 m,

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~~means for~~ continuous thermal insulation, said insulation ~~means~~ comprising prefabricated inner channel members having first longitudinal channels, said inner channel members being laid around said production/injection tube in a continuous production line with said first channels of said inner channel members facing outwardly, and prefabricated outer channel members having second longitudinal channels, said outer channel members being laid substantially flush with said first channels of said inner channel members in the continuous production line; and

~~wherein the assembly further includes means for heating comprising~~ one or more heating fluid pipes for active heating of said tube, said heating fluid pipes being laid in said first longitudinal channels of said inner channel members and enclosed by said outer channel members, wherein the channel members accommodate said heating fluid pipes and wherein the inner channel members have higher heat transfer properties than the outer channel members so as to facilitate transfer of heat from the heating fluid pipes in towards the production/injection tube and to inhibit heat transfer outwards from the production/injection line assembly.

26. (Currently Amended) A production/injection line assembly for subsea transportation of hydrocarbons, comprising:

a production/injection tube and arranged along the production/injection line, over a length of at least 100 m,

~~means for~~ continuous thermal insulation, said insulation ~~means~~ comprising prefabricated inner channel members having first longitudinal channels, said inner channel members being laid around said production/injection tube in a continuous production line with said first channels of said inner channel members facing outwardly, and with prefabricated outer channel members having second longitudinal channels, said outer channel members being laid substantially flush with said first channels of said inner channel members in the continuous production line; and

~~wherein the assembly further includes means for heating comprising~~ comprises one or more electrical heating cables for active heating of said tube, said electrical heating cables being laid in the said longitudinal channels of said inner channel members and enclosed by said outer channel members, wherein said channel members accommodate

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said electrical heating cables and wherein the inner channel members have higher heat transfer properties than the outer channel members so as to facilitate transfer of heat from the heating cables in towards the production/injection tube and to inhibit heat transfer outwards from the production/injection line assembly.

*Please add the following new Claims:*

27. (New) The assembly of Claim 1, wherein the inner channel members have a higher heat transfer coefficient than the outer channel members.

28. (New) The assembly of Claim 1, wherein the inner channel members are thinner in a radial direction than the outer channel members.